985 Nuclear Cardiology: Diagnosis of Coronary Artery Disease

Tuesday, March 18, 1997, 9:00 a.m.–11:00 a.m.
Anaheim Convention Center, Hall E
Presentation Hour: 10:00 a.m.–11:00 a.m.

985-25 Exercise SPECT Versus Exercise ECG Testing for Diagnosis of Coronary Artery Disease in Asymptomatic Patients

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Limited data exist on SPECT imaging for detection of coronary artery disease (CAD) in asymptomatic patients (pts) without previously known CAD. Accordingly, we retrospectively evaluated the accuracy of exercise (Ex) SPECT for the diagnosis of CAD in such a population. One hundred seventy-three pts (164 males, 9 females, mean age 56 ± 15 years) who had SPECT and coronary angiography within 30 days of each other were included. Pts with known CAD (previous myocardial infarction, coronary artery bypass graft surgery, coronary angioplasty or abnormal coronary angiography) were excluded. Seventy-one pts had a family history of CAD, 46 had hyperlipidemia, 23 were diabetic, 60 were hypertensive and 29 were smokers. Seventy-nine pts (46%) had normal coronary arteries or insignificant coronary stenosis, and 94 (54%) had significant CAD (>50% luminal stenosis), of whom 37 had single vessel and 57 had multivessel CAD. CAD occurred in 46% (43/93) pts with ≤ 1 risk factor, compared to 67% (51/76) pts with ≥2 risk factors ($p < 0.01$). Sensitivity of Ex ECG and SPECT was 61% (57/94) and 83% (78/94), respectively ($p = 0.001$). Specificity was 61% (48/79) and 74% (58/79), respectively ($p = 0.091$), whereas the overall accuracy was 61% and 79%, respectively ($p < 0.0001$). The sensitivity of Ex ECG and SPECT was 41% (19/47) and 79% (37/47) ($p < 0.0001$) in pts with single vessel CAD, and 72% and 83% ($p = 0.073$) in pts with multivessel CAD, respectively. In conclusion, Ex SPECT imaging is a more accurate test than Ex ECG for diagnosis of CAD in asymptomatic pts without previously known CAD.

985-26 Improved Ischemia Detection by Combination of Physical and Mental Stress Testing

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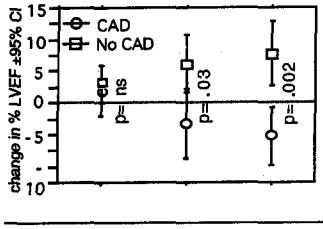
In some patients with typical angina during everyday life, conventional stress testing yields negative results. To test the hypothesis that a combined physical & mental stress test may facilitate the detection of ischemia, we performed a prospective, blinded, crossover study comparing the response to physical exercise, mental stress & the combination of both by radionuclide angiography (RNA). *Methods:* 21 subjects (age 55 ± 8 yr, 6 women) were included. 10 had typical angina & angiographically proven coronary artery disease (CAD), 11 controls had a low probability for CAD. Standard RNA was performed at rest & in randomized sequence during supine bicycle exercise, a mental stress test consisting of arithmetics & a combination of both. Automated RNA analysis was done in a blinded fashion. *Results:* (see Fig./Table) The mean maximal rate pressure product was 12870, 24833 & 25398 in the mental, physical, & combined test, respectively ($p < 0.0001$ mental vs others). In combined testing, subjects with & without CAD were better discriminated by the change in left ventricular ejection fraction at maximal stress, as compared to exercise or mental stress alone. *Conclusion:* Compared to mental stress & physical exercise alone, the combination of physical exercise with mental arithmetics led to an improved discriminatory power of radionuclide angiography for detection/exclusion of CAD. The modulation of the ischemic response by mental stress in addition to physical exercise reflects pathophysiologic mechanisms for commonly observed discrepancies between history of angina & negative stress test in the laboratory.



	Mental stress	Physical exercise	Combined testing
Sensitivity	50%	70%	80%
Specificity	82%	73%	91%
Pos pred. value	71%	70%	89%
Neg pred. value	64%	73%	83%
Accuracy	67%	71%	86%

985-27 Technetium-99m-Tetrofosmin Myocardial SPECT: Evaluation of Two Different Protocols in Daily Clinical Practice

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We studied 157 consecutive patients (pts) (101 male, 56 female) with ^{99m}Technetium (Tc)-Tetrofosmin SPECT, to assess the relative value of a same-day versus a separate-day imaging protocol in daily clinical practice. In a subgroup of 60 pts the diagnostic value of both protocols was assessed, using coronary arteriography (CAG) as the gold standard. In 69 pts (Group I), of whom 26 pts (38%) underwent CAG, a same-day protocol, and in 88 pts [Group II, 34 pts (39%) CAG] a separate-day imaging protocol was performed. In Group I SPECT 250 MBq (7 mCi) of Tc-Tetrofosmin was injected at rest. Four hours later 750 MBq (20 mCi) was administered at peak exercise. In Group II 500 MBq (14 mCi) was injected at rest and at peak exercise on two separate days. SPECT images were acquired 30–60 min after injection. The following results were obtained.

	Group I	Group II	p-value
Scintigraphic findings			
Number of segments	621	792	
Normal segments	486 (78%)	597 (75%)	NS
Reversible defects	56 (9%)	70 (9%)	NS
Persistent defects	79 (13%)	125 (16%)	NS
Overall Accuracy			
Number of patients	26	34	
	85% (22/26)	88% (30/34)	NS
Vessel Related Accuracy			
Number of vessel regions	78	102	
LAD	85% (22/26)	91% (31/34)	NS
RCA	81% (21/26)	74% (25/34)	NS
LCX	88% (23/26)	88% (30/34)	NS
Overall	85% (66/78)	84% (86/102)	NS

Tc-Tetrofosmin SPECT imaging is adequate for the detection and localization of CAD. Imaging with the same-day and separate-day protocols provides similar diagnostic accuracy allowing equal utility of both approaches in daily practice.

985-28 Correlation of Technetium-99m-Sestamibi Lung Uptake With Coronary Artery Disease Severity and Left Ventricular Function

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A relationship between Sestamibi lung uptake and extent of coronary disease has not been previously established. Resting and stress induced lung-heart ratios (LHR) were determined in 96 patients who underwent Sestamibi myocardial perfusion imaging, as well as coronary angiography within four months of the perfusion study. LHR values were studied against angiographic disease severity score (CAD Score; range 0–36), and degree of left ventricular (LV) dysfunction (n = 42). A CAD score of ≥24 was associated with a higher stress LHR than a CAD score of 0 ($p = 0.009$). Patients with severely impaired LV function (EF < 30%) also had a higher mean stress LHR than those with normal LV function ($p = 0.01$). Stress LHR was significantly greater than resting LHR in patients with coronary disease (0.321 ± 0.008 vs. 0.301 ± 0.008, $p = 0.003$), and impaired left ventricular function (0.350 ± 0.019 vs. 0.314 ± 0.016, $p = 0.019$). CAD Score correlated with stress (but not resting) LHR ($p = 0.006$), whereas the degree of left ventricular dysfunction correlated with both resting ($p = 0.046$) and stress LHR ($p = 0.004$). Two independent predictors of increased stress LHR were left anterior descending (LAD, p =